

**Additional Reasons To Apply The Precautionary Principal
To EMF Radiation Exposure From Smart Meters**

1D Short and long term exposure effects on children are largely unknown and have only just begun to be studied. Because there are existing levels of EMF is not justification for adding even more EMF to children's environments.

Doctors are calling for precaution:

1. *Advanced Research on Interaction Mechanisms of electromagnetic exposures with Organisms for Risk Assessment (ARIMMORA)*. Project funded by the European Commission and is not due for completion until 2014. http://ec.europa.eu/health/electromagnetic_fields/docs/fp7_arimmora.pdf
Abstract: Based on epidemiological evidence supporting an association between residential exposure to extremely low frequency magnetic fields (ELF MF) and childhood leukaemia, ELF MF have been classified as possibly carcinogenic to humans. The proposed project aims to scrutinize the underlying biophysical mechanisms and to clarify a possible causal relationship between ELF MF exposure and cancer, especially childhood leukaemia. This will be achieved by 1) developing and applying novel experimental and computational techniques to close knowledge gaps in the exposure assessment to ELF MF and 2) applying advanced biological in vitro, ex vivo and in vivo models and techniques under well-defined exposure conditions to test likely interaction mechanisms. The selected experimental approach is based on epidemiological evidence and current knowledge about the molecular processes underlying acute leukaemia in children.
2. American Academy of Pediatrics, *Letter to the FCC dated July 12, 2012*; [Copy filed in Docket]
Excerpt: The American Academy of Pediatrics (AAP), a non-profit professional organization of 60,000 primary care pediatricians, pediatric medical sub-specialists, and pediatric surgical specialists dedicated to the health, safety and well-being of infants, children, adolescents, and young adults strongly supports the proposal for a formal inquiry into radiation standards for cell phones and other wireless products... Although wireless devices sold in the United States must ensure that they do not exceed the maximum allowable SAR limit when operating at the device's highest possible power level, concerns have been raised that long-term RF exposure at this level affects the brain and other tissues and may be connected to types of brain cancer, including glioma and meningioma.
3. Austrian Medical Association. *Guideline of the Austrian Medical Association () for the diagnosis and treatment of EMF related health problems and illnesses (EMF syndrome)*. Consensus paper of the Austrian Medical Association's EMF Working Group, 2012, Vienna [Copy filed in Docket]
4. Environment & Human Health (EHHI), *Cell Phones: Technology Exposures Health Effects*, 2012 [Copy filed in Docket] **Excerpt (pg 47):** *Precautionary Warnings for Children* Despite U.S. agency opinions that insufficient evidence exists to warrant precautionary warnings, there remains concern that the RF exposure from cell phones may pose a risk to children. International conferences and reports continue to discuss this subject.¹¹³ **Excerpt (pg 63):** The federal government should evaluate cumulative exposure to radiofrequency radiation in pregnant women and children. Devices that

contribute to total exposure include cell phones, cordless DECT phones, wireless handsets, wireless headsets, wireless routers, Bluetooth devices, wireless alarm systems, etc.

5. U.S. National Toxicology (2011) *Cell Phone Radiofrequency Radiation Studies*. National Institute of Environmental Health Sciences NIH-HHS [an anticipated completion in 2013, with subsequent reporting and peer review of the data in 2013–2014]
http://www.niehs.nih.gov/health/assets/docs_a_e/cell_phone_radiofrequency_radiation_studies_508.pdf
Excerpt: Currently, wireless communication devices are used by more than 302 million Americans, or greater than 96 percent of the U.S. population. Given this large number of users, if adverse health effects are shown to be associated with cell phone use, this could potentially be a widespread public health concern. The nomination for the National Toxicology Program (NTP) to study cell phone radiofrequency radiation was made by the U.S. Food and Drug Administration (FDA) because of the following: • Widespread human exposure. • Current exposure guidelines are based largely on protection from acute injury from thermal effects. • Little is known about potential health effects of long-term exposure to radiofrequency radiation. • Sufficient data from human studies may not be available for several years.
6. U.S. National Research Council 2008 Report, *Identification of Research Needs Relating to Potential Biological or Adverse Health Effects of Wireless Communication Devices*
<http://www.nap.edu/catalog/12036.html> [Full report filed in Docket] ; The National Research Council was organized by the National Academy of Sciences in 1916 to associate the broad community of science and technology with the Academy's purposes of furthering knowledge and advising the federal government. National Research Council, whose members are drawn from the councils of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine. **Excerpt (pg 5): Research Needs** 1. There is a need to characterize exposure of juveniles, children, pregnant women, and fetuses, both for personal wireless devices (e.g., cell phones, wireless personal computers [PCs]) and for RF fields from base station antennas including gradients and variability of exposures, the Environment in which devices are used, and exposures from other sources, multilateral exposures, and multiple frequencies. 2. Wireless networks are being built very rapidly, **Research Gaps Research Ongoing** 1. Although several dosimetric models are currently available for children and individuals of reduced stature, a research gap remains in the further development of models of several heights for men, women, and children of various ages for use in the characterization of SAR distributions for exposures characteristic of cell phones, wireless PCs, and base stations. Judged to Be of Lower Priority 2. Presently, there is negligible or relatively little knowledge of local SAR concentration (and likely heating) in close proximity to metallic adornments and implanted medical devices for the human body. (pg. 6) **Children Research Needs** 1. Prospective Cohort Studies of Pregnancy and Childhood. Children are potentially exposed from conception through maternal wireless device use and then postnatally when they themselves become users of mobile phones. 2. Case-control Study of Children Mobile Phone Users and Brain Cancer. Owing to widespread use of mobile phones among children and adolescents and the possibility of relatively high exposures to the brain, investigation of the potential effects of RF fields in the development of childhood brain tumors is warranted. **Research Gaps Research Ongoing** 1. Case-control studies of childhood cancer with improved exposure assessment taking into account all major fixed point sources of RF exposure (base stations, AM, FM, TV antennas, and other sources).

7. MOBI-Kids Project, *Are communication technologies and environmental exposures risk factors for brain cancer in young people?* European Community's Seventh Framework Program (FP7/2007-2013) under Grant Agreement 226873 <http://www.mbkds.com/news/press-release-11052009> <http://www.mbkds.com/frequently-asked-questions-0> **Excerpt:** Start of international multi-centre study MOBI-KIDS, involving research groups in 13 countries investigating a relationship between communication technologies including mobile phones and environmental factors and brain cancer in young people. Among the childhood malignancies, brain tumours are the second most common malignancy, after leukemia. The incidence of these tumours in young people under 20 years of age has been increasing recently. Although survival has improved considerably, the prevention of brain tumours is an important aim, but continues to be a challenge. So far, little is known about risk factors for brain tumours. Some factors (e.g. exposure to ionizing radiation) and family history of brain cancer are known to increase the risk of developing brain tumours. Other environmental factors (e.g., exposure to chemicals, nutrition during pregnancy or exposure to electromagnetic fields including cellular phone use) may be associated with brain tumours. With respect to the latter, the use of cellular phones and other communication technologies has increased dramatically over the last decade, especially in children and its role in the development of brain cancer in young people has yet to be studied.

8. *Porte Alegre Resolution: International Workshop on Non-Ionizing Radiation, Health and Environment 2009*, sponsored by Brazilian Health Ministry, Porto Alegre Environmental Council, CEVS/RS, ICEMS and others [**Signed by 52 international MDs, PhDs, Professors & scientists**] [**Copy filed in Docket**] **Excerpt:** We agreed that the protection of health, well-being and the environment requires immediate adoption of the Precautionary Principle, which states, "when there are indications of possible adverse effects, though they remain uncertain, the risks from doing nothing may be far greater than the risks of taking action to control these exposures. The Precautionary Principle shifts the burden of proof from those suspecting a risk to those who discount it", until new scientific discoveries are recognized as the only criterion for the establishment or modification of non-ionizing radiation exposure standards;.. We are concerned about the body of evidence that indicates that exposure to electromagnetic fields interferes with basic human biology and may increase the risk of cancer and other chronic diseases. The exposure levels at which these effects have been observed are many times lower than the standards promulgated by the International Commission for Non-Ionizing radiation Protection (ICNIRP) [4] and the IEEE's International Committee on Electromagnetic Safety (ICES) [5]. These standards are obsolete and were derived from biological effects of short-term high intensity exposures that cause health effects by temperature elevation and nerve excitation discovered decades ago. Recent research indicates that electromagnetic fields could cause detrimental health effects even at very low levels of exposure. The ICNIRP and IEEE/ICES standards are being supported and promoted by interested parties to avoid precautionary technical planning, precautionary laws, and precautionary advice to the public

9. *Sound Exposure and Risk Assessment of Wireless Network Devices* (SEAWIND). Project funded by the European Commission and is not due for completion until the end of 2013. <http://seawind-fp7.eu/uploads/Project%20Leaflet.pdf> **Excerpt:** Overall, the research has mainly focused on the exposure and health risk evaluations of cellular networks and mobile phones. Studies on the effects of the pervasive and prolonged EMF exposure on human health due to the exponential growth of wireless network device usage are still lacking... The project "Sound Exposure and Risk Assessment of Wireless Network Devices (SEAWIND) aims to address the questions concerning exposure and health risk. The SEAWIND project commenced on December 1, 2009. This effort consists of eight world-renowned expert groups representing a wide range of expertise ranging from engineering to biology from five European countries, including Switzerland, Germany, Belgium, Greece, and Denmark.

10. Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR) 2009 Report, *Research Needs And Methodology To Address The Remaining Knowledge Gaps On The Potential Health Effects Of EMF- Section 4.1.1.2. Health effects of RF fields from wireless communication in children.* European Commission, Directorate C: Public Health and Risk Assessment Unit C7 - Risk Assessment, Brussels.
http://ec.europa.eu/health/ph_risk/committees/04_scenihr/docs/scenihr_o_024.pdf (Excerpt, pg. 5): Recently, SCENIHR delivered its opinion on Health Effects of Exposure to EMF where considerable knowledge gaps in a number of areas regarding possible health effects from various frequency bands were identified (SCENIHR 2009). Accordingly, a number of research recommendations were suggested to overcome deficiencies in data necessary for proper risk assessment. **1. Research recommendations; Radio frequency fields** - Health effects from RF fields from wireless communication in adults (prospective cohort study). - Health effects from RF fields from wireless communication in children (interdisciplinary research including dosimetry, epidemiology and animal studies). - RF field mechanisms and verification of important but preliminary findings (experiments testing the existence of modulation-specific effects or demodulation of RF signals in biological structures; experimental studies on EEG patterns and sleep. (Excerpt, pg. 16): *Study type:* Interdisciplinary research including DOSIMETRY, EPIDEMIOLOGY, and ANIMAL STUDIES. *Rationale/justification:* Children are exposed to RF fields from mobile telecommunications equipment earlier and thus have longer life-time exposure than present day adults. They may also be more susceptible than adults due to anatomical and morphological differences and as they are exposed during development. Available and ongoing research is mainly limited to case control studies on childhood brain tumours. *Hardly any research has been done on the effects of exposure to EMF on the development of the central nervous system, on cognitive functions in children, and on behaviour.* More data are also needed on children younger than those who have been studied to date. Animal experiments on early brain and behaviour development can answer some of the questions related to effects on children.
11. World Health Organization (2010), *WHO Research Agenda for Radiofrequency Fields* http://whqlibdoc.who.int/publications/2010/9789241599948_eng.pdf Excerpt (pg 14): *High-priority research needs:* • **Prospective cohort studies of children and adolescents with outcomes including behavioural and neurological disorders and cancer, Rationale:** As yet, little research has been conducted in children and adolescents and it is still an open question whether children are more susceptible to RF EMF since the brain continues to develop during childhood and adolescence. Also, children are starting to use mobile phones at a younger age. (Excerpt, pg 16): • **Further RF EMF provocation studies on children of different ages Rationale:** Current research has focused primarily on adolescents; very little is known about possible effects in younger children. Longitudinal testing at different ages, for example by studying children already participating in current cohort studies, is recommended. (Excerpt, pg 17): • **Effects of early-life and prenatal RF exposure on development and behavior, Rationale:** There is still a paucity of information concerning the effects of prenatal and early life exposure to RF EMF on subsequent development and behaviour. Such studies are regarded as important because of the widespread use of mobile phones by children and the increasing exposure to other RF sources such as wireless local area networks (WLAN s) and the reported effects of RF EMF on the adult EEG. Further study is required which should include partial (head only) exposure to mobile phones at relatively high specific absorptionrate (SAR) levels. (Excerpt, pg 18): *Other research needs* • **Effects of RF exposure on reproductive organs, Rationale:** The available data concerning possible effects of RF EMF from mobile phones on male fertility are inconsistent and their quality and exposure assessments are weak. In vivo studies on fertility should consider effects on both males and females and investigate a range of relevant endpoints including RF EMF effects on the development and function of the endocrine system.

12. World Health Organization (2006), *WHO Research Agenda for Radiofrequency Fields* http://www.who.int/peh-emf/research/rf_research_agenda_2006.pdf : Excerpt (pg. 3): **High priority research needs:** • **A large-scale multinational case-control study of brain cancer risk in children in relation to mobile phone use, following a feasibility study.** *Rationale:* Few relevant epidemiological or laboratory studies have addressed the possible effects of RF exposure on children [INTERPHONE study did not include children as the number of long term users among children at the start of the study was too low for such a study to be informative]. Because of widespread use of mobile phones among children and adolescents and relatively high exposures to the brain, investigation of the potential effects of RF fields on the development of childhood brain tumours is warranted. The uncertainty about the recent findings in adults also applies to children. Because brain cancer in young people is quite rare, a case-control study is recommended as the most appropriate and cost-effective approach. • **Prospective cohort study of children and adolescent mobile phone users and all health outcomes other than brain cancer such as cognitive effects and effects on sleep quality.** *Rationale:* Cognitive effects and other general health outcomes have been anecdotally reported in mobile phone users. These endpoints are critical for children because of the importance of cognitive abilities and learning in early development. The outcomes can be assessed in a prospective cohort study of children. (at pg. 5) • **If ethical approval can be obtained, acute effects on cognition and EEGs should also be investigated in children exposed to RF fields in the laboratory.** *Rationale:* Possible RF effects on children were specifically raised by the UK's Independent Expert Group on Mobile Telephones (IEGMP, 2000) and the Istanbul WHO workshop (Kheifets et al. Pediatrics. 2005 116: 303-313). Cognitive effects are a priority research area.
13. **Venice Resolution: ICEMS June 6, 2008. [Signed by 51 international MDs, PhDs, Professors & scientists]** http://www.icems.eu/benevento_resolution.htm **Excerpt:** As stated in the Benevento Resolution of September 2006, we remain concerned about the effects of human exposure to electromagnetic fields on health. At the Venice Workshop, entitled, "Foundations of bioelectromagnetics: towards a new rationale for risk assessment and management," we discussed electrohypersensitivity, blood brain barrier changes, learning and behavioral effects, changes in anti-oxidant enzyme activities, DNA damage, biochemical mechanisms of interaction, biological damage and, experimental approaches to validate these effects. As an outcome, we are compelled to confirm the existence of non-thermal effects of electromagnetic fields on living matter, which seem to occur at every level of investigation from molecular to epidemiological. An urgent task before international researchers is to discover the detailed mechanisms of non-thermal interactions between electromagnetic fields and living matter. A collateral consequence will be the design of new general public and occupational protection standards. We, who are at the forefront of this research, encourage an ethical approach in setting of exposure standards which protect the health of all, including those who are more vulnerable. We recognize the need for research to reveal the critical exposure parameters of effect and risk from exposure to electromagnetic fields.